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WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

H04N 5/45

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification⁵:

H04N 5/45

A1

(11) International Publication Number:

WO 92/09170

(43) International Publication Date:

29 May 1992 (29.05.92)

(21) International Application Number: PCT/EP91/02084

(22) International Filing Date: 5 November 1991 (05.11.91)

(30) Priority data:

9024706.5

14 November 1990 (14.11.90) GB

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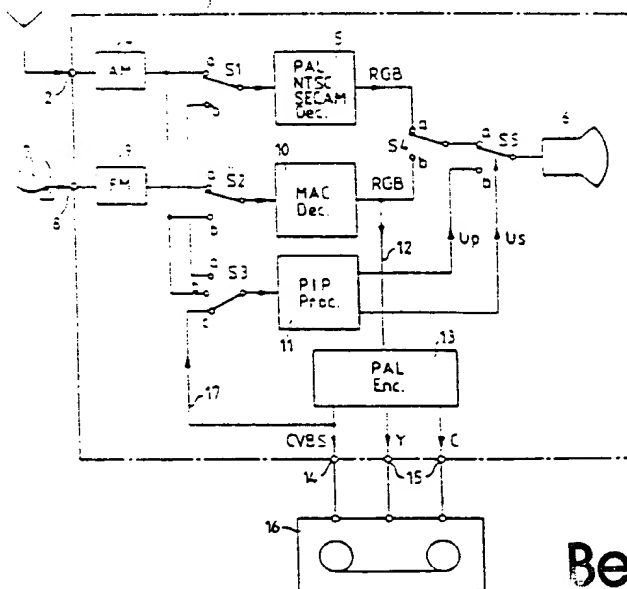
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(81) Designated States: AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH (European patent), CI (OAPI patent), CM (OAPI patent), CS, DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GA (OAPI patent), GB (European patent), GN (OAPI patent), GR (European patent), HU, IT (European patent), JP, KP, KR, LK, LU (European patent), MC, MG, ML (OAPI patent), MN, MR (OAPI patent), MW, NL (European patent), NO, PL, RO, SD, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.

Published

With international search report.

(54) Title: TELEVISION RECEIVER INCLUDING A PICTURE-IN-PICTURE PROCESSOR



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(57) Abstract

Within a television receiver adapted for MAC reception and including a PIP processor in case the MAC signal is fed to the PIP processor a MAC decoder is needed as the PIP processor can handle only the composite PAL video signal. It is an object to simplify the circuit means in case of PIP display of a MAC signal. According to the invention switching means S3 are provided for connecting the input of the PIP processor to the output of a PAL encoder which is provided for furnishing output signals for a video tape recorder. Especially for a colour television receiver designed for MAC reception and PIP display.

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Television receiver including a picture-in-picture processor.

The invention relates to a television receiver including a PIP processor. This invention is described in terms of the MAC and PAL systems equally applicable to any two different composite or component television systems. Within a television receiver with PIP (picture in picture) reproduction a first video signal which may be received by an antenna is used for displaying the so-called main picture on the screen of the picture tube. Additionally a second video signal which may come from a second antenna via a second tuner or from any other video source connected to the receiver is used for additionally displaying a so-called sub-picture constituting a small picture inserted into the main picture. The second video signal is fed to a so-called PIP processor modifying the video signal for production of the small sub-picture. Said processor essentially includes memory circuits for selecting special lines and time compressing the video signals of said lines.

On the other hand there are television receivers having additionally to the normal circuits a special decoder for decoding special or encrypted signals. One example for such a special signal is the MAC signal. In case said MAC signal shall be used for the small sub-picture than the PIP processor additionally to its normal PIP functions has to decode the MAC signal. In this case, therefore, the PIP processor becomes rather complicated and expensive.

It is an object of the invention to modify the television receiver in such a way that even in case the special encoded or encrypted signal is used for the sub-picture the PIP processor does not need an additional encoder for said special signal.

According to the invention within a television receiver including a PIP processor an extra decoder for specific coded or encrypted signals said decoder having outputs used for picture reproduction and further being connected to inputs of an encoder having Y/C and/or CVBS outputs being connected to output terminals of the receiver dedicated for connecting a video recorder thereto switching means are provided for connecting said Y/C or CVBS output to the input of said PIP processor.

The invention, therefore, makes use of an encoder preferable a PAL encoder provided within the television receiver for furnishing signals for an external video recorder connected to the receiver for simplifying the PIP processor in case a special signal like a MAC signal or an encrypted signal is intended to be used for displaying the small sub-picture. By this way it is achieved that the decoder for the special signal must be provided only once within the receiver whereas the PIP processor itself does not need the specific decoder. In other words, an output terminal of the receiver dedicated for connecting a video recorder to the receiver is fed back into the receiver for additionally feeding the PIP processor in case the sub-picture is derived from said special or encrypted signal. If a special fee is to be paid for a decryption or descrambling within the specific decoder said fee has to be paid only once because for the video recorder connected to the receiver on the one hand and the specific decoding for the PIP processor on the other hand only one specific decoder is needed.

Said special signal preferably is a MAC signal. It may also be an encrypted or scrambled signal being not a MAC signal, e.g. an encrypted PAL, SECAM or NTSC signal. The special signal also may be a MAC signal being additionally encrypted or scrambled.

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- 1 In order that the invention may more readily be understood, a description is now given by way of example only, reference being made to the drawing. The single Figure of the drawing shows in simplified form a television receiver with means
- 5 for additionally handling a MAC signal and provided for PIP reproduction. The Figure shows signals applied to the receiver from two antennae, one of them being a satellite dish, the other is shown as an antenna for terrestrial reception. This is by way of an example only, and the signals can
- 10 originate from radiating or conducting sources, such as satellites, terrestrial transmitters, cable systems, video recorders using tapes or discs, these sources being used in any combination.
- 15 Within the Figure a first antenna 1 for terrestrial reception is connected to input terminal 2 of television receiver 3. Terminal 2 is connected via the first AM tuner 4 and switch S1 to a decoder 5 which may be a PAL NTSC or SECAM decoder. Decoder 5 furnishes RGB signals fed via switches
- 20 S4, S5 to picture tube 6 for reproduction. The normally provided video output stages before the tube 6 are not shown for case of simplification. A second antenna 7 in form of a dish for microwave reception is connected to second input terminal 8 which is connected via a second FM tuner 9 and switch S2 to a MAC decoder 10. Decoder 10 also provides RGB signals being switchable to tube 6 via switches S4, S5. Switches S1, S2 are arranged to connect each of signals at terminals 2, 8 to decoders 5 or 10 in correspondence with the form of signal received by antennas 1 or 7.
- 25 Outputs of tuners 4, 9 additionally are connectable to input of a PIP processor 11. Processor 11 provides a signal Up for reproduction of a small sub-picture. Processor 11 generates a so-called fast switching voltage Us actuating switch S5.
- 30 During display of the sub-picture switch S5 is switched by

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4 Us into position b so that instead of signal from decoder 5 or 10 signal Up from processor 11 is inserted. For example the main picture on tube 6 is derived from a MAC signal received by antenna 7 switch S2 being in position a, switch S4 in position b and switch S5 in position a. PIP processor 11 on the other hand simultaneously is fed by a signal received from antenna 1 with switch S3 being in position b.

10 If, however, the sub-picture made by Up shall be derived from a received MAC signal, switch S3 being in position a, then the processor 11 additionally needs to include an additional specific decoder for MAC. Said additional decoder within processor 11 is avoided in the following way.

15 RGB signals from MAC decoder 10 used for picture reproduction additionally are fed via leads 13 to PAL encoder 13. Encoder 13 provides at output terminal 14 a composite PAL signal CVBS and at output terminals 15 additionally a Y/C signal at different leads, Y being the luminance signal and C the chroma signal. Output terminals 14, 15 are provided for connecting a video recorder 16 thereto, alternatively to terminal 14 or to terminal 15. CVBS signal at terminal 14 is used for a normal domestic video recorder whereas terminals 15 are used for a domestic video recorder working according to the Y/C principle. Terminal 14 ordinary being an output terminal only for connecting a video recorder thereto is fed via lead 17 to one input of switch S3. In case a received MAC signal shall be used for the sub-picture switch S3 is switched into position c so that PIP processor 11 receives 20 the normal CVBS signal which is already MAC decoded and/or additionally descrambled within decoder 10. The specific MAC decoder 10 which may also include a decryption or descrambling circuit therefore additionally is used for providing a normal signal not MAC encoded and not encrypted for 25 PIP processor 11.

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In the example shown decoder 10 provides RGB signals. Likewise decoder 10 may provide signals in the form Y/U, V or a composite PAL video signal CVBS. Decoder 5 may likewise work for a PAL, a NTSC or a SECAM signal. In the same way encoder 13 may be instead of a PAL encoder a SECAM encoder or a NTSC encoder for connecting a video tape recorder for said signals to receiver 3.

CLAIMS

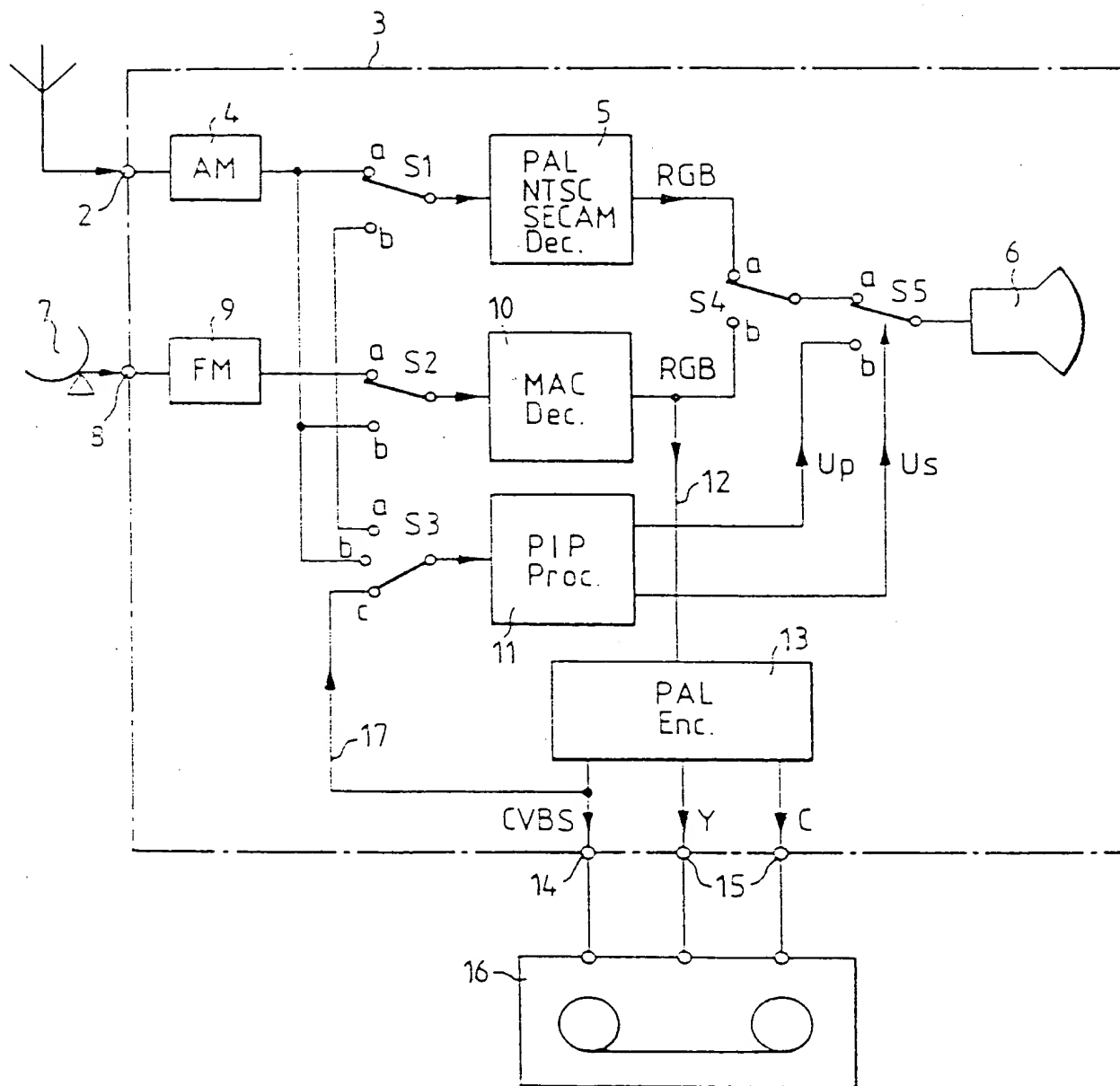
1. Television receiver including a PIP processor and an extra decoder for a specific coded or encrypted signal said decoder having outputs used for picture reproduction and further being connected to inputs of an encoder having Y/C and/or CVBS outputs being connected to output terminals of the receiver dedicated for connecting a video recorder thereto, characterized by switching means (83) for connecting said Y/C or CVBS output (14,15) to the input of said PIP processor (11).
2. Receiver according to Claim 1, characterized in that said special coded signal is a MAC signal.
3. Receiver according to Claim 2, characterized in that said MAC signal is an encrypted signal.
4. Receiver according to Claim 1, characterized in that said encoder (13) is a PAL encoder.
5. Receiver according to Claim 1, characterized in that said Y/C or CVBS outputs are component Y/C and/or CVBS outputs.
6. Receiver according to Claim 1, characterized in that the outputs of said decoder (10) are RGB outputs.
7. Receiver according to Claim 1, characterized in that the outputs of said decoder (10) are Y, UV or CVBS outputs.
8. Receiver according to Claim 1, characterized in that the output from the said encoder (13) is not available for external connection, but the output from the said

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encoder is used within the receiver for picture and picture processing.

9. Receiver as described within the specification and the drawing.

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INTERNATIONAL SEARCH REPORT

International Application No PCT/EP 91/02084

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC IPC5: H 04 N 5/45																	
II. FIELDS SEARCHED <div style="text-align: right; font-size: small;">Minimum Documentation Searched⁷</div> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> Classification System¹ IPC5 </td> <td style="width: 50%; border: none; vertical-align: top;"> Classification Symbols H 04 N </td> </tr> </table> <div style="text-align: center; font-size: x-small; margin-top: 5px;"> Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched⁸ </div>			Classification System ¹ IPC5	Classification Symbols H 04 N													
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III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹ <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th style="width: 10%;">Category *</th> <th style="width: 70%;">Citation of Document,¹¹ with indication, where appropriate, of the relevant passages¹²</th> <th style="width: 20%;">Relevant to Claim No.¹³</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top;">A</td> <td>US, A, 4682234 (S.V. NAIMPALLY) 21 July 1987, see the whole document --</td> <td style="text-align: center; vertical-align: top;">1-9</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">A</td> <td>US, A, 4729027 (HAKAMADA ET AL) 1 March 1988, see column 1, line 55 - line 63 --</td> <td style="text-align: center; vertical-align: top;">1-9</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">A</td> <td>US, A, 4959719 (STRUBBE ET AL) 25 September 1990, see the whole document --</td> <td style="text-align: center; vertical-align: top;">1-9</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">A,P</td> <td>EP, A2, 0409562 (SONY CORPORATION) 23 January 1991, see page 4, line 33 - line 37 -- -----</td> <td style="text-align: center; vertical-align: top;">1-9</td> </tr> </tbody> </table>			Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	A	US, A, 4682234 (S.V. NAIMPALLY) 21 July 1987, see the whole document --	1-9	A	US, A, 4729027 (HAKAMADA ET AL) 1 March 1988, see column 1, line 55 - line 63 --	1-9	A	US, A, 4959719 (STRUBBE ET AL) 25 September 1990, see the whole document --	1-9	A,P	EP, A2, 0409562 (SONY CORPORATION) 23 January 1991, see page 4, line 33 - line 37 -- -----	1-9
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<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>* Special categories of cited documents:¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 50%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p> </div> </div>																	
IV. CERTIFICATION <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> Date of the Actual Completion of the International Search 21st January 1992 </td> <td style="width: 50%; border: none; vertical-align: top;"> Date of Mailing of this International Search Report 10.01.92 </td> </tr> <tr> <td style="width: 50%; border: none; vertical-align: top;"> International Searching Authority EUROPEAN PATENT OFFICE </td> <td style="width: 50%; border: none; vertical-align: top;"> Signature of Authorized Officer </td> </tr> </table>			Date of the Actual Completion of the International Search 21st January 1992	Date of Mailing of this International Search Report 10.01.92	International Searching Authority EUROPEAN PATENT OFFICE	Signature of Authorized Officer 											
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**ANNEX TO THE INTERNATIONAL SEARCH REPORT
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4682234	21/07/87	CA-A- 1247232	20/12/88
		EP-A-B- 0228746	15/07/87
		JP-A- 62224170	02/10/87
US-A- 4729027	01/03/88	AU-D- 6694386	09/07/87
		CA-A- 1265611	06/02/90
		EP-A- 0229032	15/07/87
		JP-A- 62159583	15/07/87
US-A- 4959719	25/09/90	EP-A- 0376376	04/07/90
		JP-A- 2218277	30/08/90
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